$costvar,\ c$
$termvar,\ x,\ y,\ z,\ f$
$baseAttackVar,\ b$
$index,\ i,\ j,\ k$

$$
\begin{array}{lll}
op & ::= & \\
 & | & \mathsf{op}_{\odot} \\
 & | & \mathsf{op}_{\triangleright} \\
 & | & \mathsf{op}_{\sqcup} \\
 & | & \mathsf{rel}_{\multimap} \\
 & | & \mathsf{rel}_{\circ\!\!-\!\!\circ} \\
 & | & \mathsf{rel}_{\rightarrow}(c, -) \\
 & | & \mathsf{rel}_{\leftarrow}(c, -) \\
 & | & \mathsf{rel}_{\multimap}(c, -) \\
 & | & \mathsf{rel}_{\circ\!\!-\!\!\circ}(c, -)
\end{array}
$$

$$
\begin{array}{lll}
C & ::= & \\
 & | & c \\
 & | & op(C_1, C_2)
\end{array}
$$

$$
\begin{array}{lll}
T & ::= & \\
 & | & b \\
 & | & T_1 \odot T_2 \\
 & | & T_1 \triangleright T_2 \\
 & | & T_1 \sqcup T_2 \\
 & | & (T)
\end{array}
$$

$$
\begin{array}{lll}
E & ::= & \\
 & | & b \\
 & | & E_1 \odot E_2 \\
 & | & E_1 \triangleright E_2 \\
 & | & E_1 \sqcup E_2 \\
 & | & (E_1, c) \multimap E_2 \\
 & | & E_1 \circ\!\!-\!\!\circ E_2 \\
 & | & (E) \qquad\qquad \mathsf{S}
\end{array}
$$

$$
\begin{array}{lll}
\Gamma,\ \Delta,\ \Theta,\ \Psi & ::= & \\
 & | & \cdot \\
 & | & (E, c) \\
 & | & \Theta, \Psi
\end{array}
$$

$\boxed{\Gamma; \Delta \vdash_C^T T}$

$$\frac{}{\cdot; (b, c) \vdash_c^T b} \quad \text{T\_VAR}$$

$$\frac{}{(b, c); \cdot \vdash_c^T b} \quad \text{T\_VARC}$$

$$\frac{\Gamma_1; \Delta_1 \vdash_{c_1}^T T_1 \quad \Gamma_2; \Delta_2 \vdash_{c_2}^T T_2}{\Gamma_1, \Gamma_2; \Delta_1, \Delta_2 \vdash_{\mathsf{op}_{\odot}(c_1, c_2)}^T T_1 \odot T_2} \quad \text{T\_PARA}$$

$$\frac{\Gamma_1; \Delta_1 \vdash_{c_1}^T T_1 \quad \Gamma_2; \Delta_2 \vdash_{c_2}^T T_2}{\Gamma_1, \Gamma_2; \Delta_1, \Delta_2 \vdash_{\mathsf{op}_{\triangleright}(c_1, c_2)}^T T_1 \triangleright T_2} \quad \text{T\_SEQ}$$

$$\frac{\Gamma_1;\Delta_1 \vdash^T_{c_1} T_1 \quad \Gamma_2;\Delta_2 \vdash^T_{c_2} T_2}{\Gamma_1,\Gamma_2;\Delta_1,\Delta_2 \vdash^T_{\mathsf{op}_\sqcup(c_1,c_2)} T_1 \sqcup T_2}\ \text{T\_CHOICE}$$

$\boxed{\Theta;\Psi \vdash_C E}$

$$\frac{}{\cdot;(E,c) \vdash_c E}\ \text{E\_VAR}$$

$$\frac{}{(E,c);\cdot \vdash_c E}\ \text{E\_VARC}$$

$$\frac{\cdot;\cdot \vdash_c T}{\cdot;\cdot \vdash_c (T \sqcup T) \multimap T}\ \text{E\_CHOICECONT}$$

$$\frac{\cdot;\cdot \vdash_c T_1 \sqcup T_2}{\cdot;\cdot \vdash_c (T_1 \sqcup T_2) \multimap (T_2 \sqcup T_1)}\ \text{E\_CHOICESYM}$$

$$\frac{\cdot;\cdot \vdash_c (T_1 \sqcup T_2) \sqcup T_3}{\cdot;\cdot \vdash_c ((T_1 \sqcup T_2) \sqcup T_3) \multimap (T_1 \sqcup (T_2 \sqcup T_3))}\ \text{E\_CHOICEASSOC}$$

$$\frac{\cdot;\cdot \vdash^T_c T_1 \odot (T_2 \rhd T_3)}{\cdot;\cdot \vdash_c (T_1 \odot (T_2 \sqcup T_3)) \multimap ((T_1 \odot T_2) \sqcup (T_1 \odot T_3))}\ \text{E\_DISTPARA1}$$

$$\frac{\cdot;\cdot \vdash^T_c T_1 \rhd (T_2 \sqcup T_3)}{\cdot;\cdot \vdash_c (T_1 \rhd (T_2 \sqcup T_3)) \multimap ((T_1 \rhd T_2) \sqcup (T_1 \rhd T_3))}\ \text{E\_DISTSEQ1}$$

$$\frac{\cdot;\cdot \vdash^T_c (T_2 \rhd T_3) \odot T_1}{\cdot;\cdot \vdash_c ((T_2 \sqcup T_3) \odot T_1) \multimap ((T_2 \odot T_1) \sqcup (T_3 \odot T_1))}\ \text{E\_DISTPARA2}$$

$$\frac{\cdot;\cdot \vdash^T_c (T_2 \sqcup T_3) \rhd T_1}{\cdot;\cdot \vdash_c ((T_2 \sqcup T_3) \rhd T_1) \multimap ((T_2 \rhd T_1) \sqcup (T_2 \rhd T_1))}\ \text{E\_DISTSEQ2}$$

$$\frac{\Theta_1;\Psi_1 \vdash_{c_1} E_1 \quad \Theta_2;\Psi_2 \vdash_{c_2} E_2}{\Theta_1,\Theta_2;\Psi_1,\Psi_2 \vdash_{\mathsf{op}_\odot(c_1,c_2)} E_1 \odot E_2}\ \text{E\_PARAI}$$

$$\frac{\Theta_1;\Psi_2 \vdash_{\mathsf{op}_\odot(c_1,c_2)} E_1 \odot E_2 \quad \Theta_2;\Psi_1,(E_1,c_1),(E_2,c_2),\Psi_3 \vdash_{c_3} E_3}{\Theta_1,\Theta_2;\Psi_1,\Psi_2,\Psi_3 \vdash_{c_3} E_3}\ \text{E\_PARAE}$$

$$\frac{\Theta_1;\Psi_1 \vdash_{c_1} E_1 \quad \Theta_2;\Psi_2 \vdash_{c_2} E_2}{\Theta_1,\Theta_2;\Psi_1,\Psi_2 \vdash_{\mathsf{op}_\rhd(c_1,c_2)} E_1 \rhd E_2}\ \text{E\_SEQI}$$

$$\frac{\Theta_2;\Psi_2 \vdash_{\mathsf{op}_\rhd(c_1,c_2)} E_1 \rhd E_2 \quad \Theta_1,(E_1,c_1),(E_2,c_2),\Theta_3;\Psi_2 \vdash_{c_3} E_3}{\Theta_1,\Theta_2,\Theta_3;\Psi_1,\Psi_2 \vdash_{c_3} E_3}\ \text{E\_SEQE}$$

$$\frac{\Theta;\Psi_1,(E_1,c_1),(E_2,c_2),\Psi_2 \vdash_c E}{\Theta;\Psi_1,(E_2,c_2),(E_1,c_1),\Psi_2 \vdash_c E}\ \text{E\_EX}$$

$$\frac{\Theta_1;\Psi_1 \vdash_{c_1} E_1 \quad \Theta_2;\Psi_2 \vdash_{c_2} E_2}{\Theta_1,\Theta_2;\Psi_1,\Psi_2 \vdash_{\mathsf{op}_\sqcup(c_1,c_2)} E_1 \sqcup E_2}\ \text{E\_CHOICE}$$

$$\frac{\Theta;\Psi,(E_1,c_1) \vdash_{c_2} E_2 \quad \mathsf{rel}_\multimap(c_1,c_2)}{\Theta;\Psi \vdash_{c_2} (E_1,c_1) \multimap E_2}\ \text{E\_IMPI}$$

$$\frac{\Theta_1;\Psi_1 \vdash_{c_2} (E_1,c_1) \multimap E_2 \quad \Theta_2;\Psi_2 \vdash_{c_1} E_1}{\Theta_1,\Theta_2;\Psi_1,\Psi_2 \vdash_{c_2} E_2}\ \text{E\_IMPE}$$

```
Definition rules:         22 good    0 bad
Definition rule clauses:  40 good    0 bad
```